

PATENT
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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25 Inventor: Oded E. Rochman
Title: SKID PLATE AND DOOR ASSEMBLY
INCLUDING SAME
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This application claims the benefit of provisional patent application
60/255,380 filed December 15, 2000.

FIELD OF THE INVENTION

5 This invention is directed to door assemblies, and in particular, it is directed to
a skid plate for attachment to the bottom of a pre-hung door assembly whereby the
attached skid plate provides a moisture barrier and prevents door bottom wear and/or
damage during storage, handling, and shipping of the manufactured door product.

BACKGROUND OF THE INVENTION

10 Pre-hung door assemblies typically include a pair of doorjambes that extend
between a header and a threshold often called a sill plate, a door secured in its closed
position during shipping and handling, and exterior trim or molding such as
brickmold or the like that is attached to each of the doorjambes, the trim being adapted
to receive and finish-off masonry or siding material applied to the exterior of a
15 building being constructed. The wooden members located in the bottom portion of
door assemblies are often exposed to wet conditions, for example rain water, and
rotting occurs along the lower portion of such doors. In particular, such wood rot
conditions begin at the crosscut bottom ends of the doorjambes and exterior trim. This
is because such exposed end grain has a tendency to absorb and wick moisture or
20 water up into the long grain portions of the wood members, and over time, the
resulting damp, wood rotting condition, will migrate into other adjacent wooden
members along the door bottom such as wooden sill plates. Usual construction
practice involves placing door assembly bottoms on concrete supports such as
foundation walls or slabs. A protective coating such as paint or the like is then
25 applied to the exterior surfaces of the jambes, header, trim, and door. However, such

exterior protective coatings fail to solve the wood rot problems associated with the jamb and trim end grain supported on concrete surfaces. Concrete is a relatively porous material, and moisture, rain water, and standing water will actually travel through concrete and into the end grain where the moisture is wicked up into the long grain of the respective wooden members. This invention relates broadly to providing a moisture resistant skid plate attached to the bottom or threshold of a pre-hung door assembly to provide both a moisture barrier that prevents such wood rot.

After a pre-hung door assembly is manufactured, it is shipped from the mill to a dealer and then forwarded to a construction site where the door assembly is framed into a building under construction. Careless handling during the journey from the mill to the construction site often causes damage to the exposed end grain portions at the door bottom, such damage ranging from minor damage such as gouging, to major damage such as splitting that requires repair and/or replacement of the damaged jamb and trim. This invention also relates to providing a method for fixing a skid plate to a door assembly bottom to improve door bottom protection against wear and damage during storage, shipping, and handling from the manufacturing phase through final construction phase where the door is installed in a framing operation.

There have been various attempts in the past to overcome problems associated with shipping and installing pre-hung door assemblies. However, many of these earlier solutions fail to recognize the need to protect door bottoms from wood rot, and therefore, they only address the problem of mechanical damage. For example, in the past, wafer board skid plates were used to protect pre-hung door assembly bottoms from damage during shipping to the construction site. Wafer board skid plates are problematic in that they needed to be removed before the door assembly can be framed into a building. An even bigger problem associated with wafer board is that

the material readily absorbs water and often disintegrates before the door assembly reaches the construction site. Additionally, wet wafer board will accelerate wood rot along the door assembly bottom if the wet material is left in place during storage.

United States patent no. 6,161,343 to Young recognizes wood rotting
5 problems associated with exposed grain ends along door assembly bottoms. Young attempts to solve the wood rot problem by applying a sealant to the end grain portions and then covering the sealant with a plastic plate. The patent teaches applying various wood sealants to the end grain, the exemplary sealants including a conventional water seal of the type used on outside wood decks, a thick grease comprising a mixture of
10 paraffin and petroleum jelly, and a preferred sealant of olefin wax such as paraffin. After the sealant is applied to the exposed doorjamb end grain a plastic plate is attached to the respective doorjamb end by nails driven into the end grain whereby the sealant is captured between the plastic plate and the crosscut end of the jamb. The teaching of the Young patent makes it necessary to individually seal and nail a plastic
15 plate to each doorjamb end, and in instances where the door assembly includes exterior trim (brickmold), to individually seal and nail a plastic plate to each exterior trim end. A disadvantage of the Young teaching is that it requires a labor-intensive manufacturing process where each end cut member must be individually handled during a multi-step sealing and nailing process in order to protect all the crosscut door
20 members from wood rot. Another disadvantage of the Young teaching is that end nailing the plastic plates to the doorjamb and trim pieces results in a weak connection that is easily separated during shipping and handling.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a skid plate along a door assembly bottom to prevent structural damage to the door assembly parts during shipping and handling.

5 It is a further object of the present invention to furnish a skid plate along a door assembly bottom that provides a moisture barrier to prevent wood rot in the door assembly parts.

It is another object of the present invention to furnish a skid plate along a door assembly bottom that provides a moisture barrier for the doorjamb and exterior trim
10 bottom ends to prevent wood rot.

It is an additional object of the present invention to provide an improved method for fixing a skid plate to a door assembly bottom.

In satisfaction of the foregoing objects and advantages, the present invention provides a skid plate and a method for attaching the skid plate to the bottom surface of
15 a pre-hung door assembly to improve wear and moisture resistance. In one embodiment, the skid plate is formed from a generally rectangular sheet of material having a top edge; a bottom edge; first and second side edges extending between the top edge and the bottom edge; a first tab defined by a first portion of the top edge, a first portion of the first side edge, a first fold line extending from the top edge parallel
20 to the first side edge and a first cut extending from the first side edge to the first fold line, the first cut being spaced apart from the bottom edge by a first distance; a second tab defined by a second portion of the top edge, a first portion of the second side edge, a second fold line extending from the top edge parallel to the second side edge and a second cut extending from the second side edge to the second fold line; a first slit
25 extending from the bottom edge parallel to the first side edge and having a length

greater than the first distance; and a second slit extending from the bottom edge parallel to the second side edge and having a length greater than the first distance.

A pre-hung door assembly according to a preferred embodiment of the invention includes a sill plate, first and second door jambs connected to the sill plate,
5 first and second trim members having ends and being connected to the first and second door jambs, and a skid plate. The skid plate includes a first planar portion overlying the sill plate, first and second regions on the planar portion shaped to cover the ends of the first and second trim members, and a first tab normal to the first planar portion. With this configuration, the first and second regions are aligned with the
10 ends of the first and second trim members when the planar portion overlies the sill plate and the tab overlies the first side. Alternately, the door assembly according to one embodiment of the invention can be described as including a first side, a second side, a bottom including a first section having a first shape and a second section projecting from the first section and having a second shape, a skid plate having a first
15 portion shaped like and overlying the first section and a second portion shaped like and overlying the second section and at least one tab extending from the second portion and overlying a portion of the first side.

BRIEF DESCRIPTION OF THE DRAWINGS

20 The above and other objects, advantages, and novel features of the present invention will become apparent from the following detailed description of the invention illustrated in the accompanying drawings, wherein:

Figure 1 is a plan view of a skid plate blank

25 Figure 2 is a plan view along the bottom of a door assembly.

- Figure 3 is an isometric view showing the bottom of a door assembly with a skid plate blank positioned for installation.
- Figure 4 is similar to Figure 3 showing adhesive applied to the bottom of the door assembly.
- 5 Figure 5 is an isometric view showing a skid plate partially attached to the door assembly bottom.
- Figure 6 is similar to Figure 5 showing a skid plate fully attached to the door assembly bottom.
- 10 Figure 7 is an isometric view showing an alternate method for attaching a skid plate to a door assembly bottom.
- Figure 8 is a plan view of a second embodiment of a skid plate blank provided with strips of double-sided adhesive tape for securing the skid plate to the door assembly.

15 DETAILED DESCRIPTION OF THE INVENTION

The following detailed description of the present invention is directed to a skid plate and a method for attaching the skid plate to the bottom surface of a pre-hung door assembly to prevent structural damage during shipping and handling, and to provide a moisture barrier against wood rot along the door assembly bottom.

- 20 Referring to Figures 1 and 2, one possible embodiment of the present invention comprises a skid plate blank 1 adapted for attachment to the bottom surface 2 of a door assembly 3. Pre-hung door assemblies, whether comprising a hinged door or a sliding door arrangement, typically includes a pair of parallel doorjambs 4a and 4b extending between a header (not shown) and a threshold or sill plate assembly 6, exterior trim or molding 5a and 5b attached to respective doorjambs, and a door (not
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shown). The threshold or sill plate assembly 6 generally includes an extruded aluminum sill plate 7 along the exterior side of the door and a wood sill plate 8 along the interior side of the door. As heretofore mentioned, depending upon the particular building design, the door assembly bottom surface 2 is often subjected to wet or damp conditions that cause wood rot along the bottom surface, and in particular, such wood rot generally begins at the crosscut bottom ends of the doorjamb 4a and 4b and at the crosscut bottom ends of the exterior trim members 5a and 5b. This is because the end grain at such crosscut ends is especially vulnerable to wood rot because the end grain wicks moisture and water up into the long grain of the wooden members.

10 Additionally, such crosscut jamb and trim ends are easily damaged during shipping and handling.

The present invention overcomes such decay and damage problems by providing a skid plate 1 manufactured from a flexible water resistant material, for example a sheet of polyethylene or other impermeable material, that is bendable and capable of being bonded to the door assembly bottom surface 2. In the preferred embodiment, a sheet of high density polyethylene having a nominal thickness of 0.016 inches is used which material provides a satisfactory degree of wear resistance. Referring in particular to Figure 1, skid plate 1 comprises a sheet of flexible water resistant material having a first side portion 9a spaced apart from a second side portion 9b, and an elongated center portion 9c positioned between the first and second side portions 9a and 9b respectively. The first side 9a and the second side 9b are shaped by cutting, slitting and/or stamping so that the side portions substantially correspond with the doorjamb and exterior trim crosscut periphery along the bottom of a selected door assembly 3. For example, the first side 9a includes a tab 10a and a jamb/trim portion 11a. Tab 10a is defined by a slit 12a and a score-line 13a. Slit 12a

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extends in a direction from a first side edge 14a toward the skid plate centerline X-X, and the cooperating score-line 13a extends from an interior threshold edge 15 to a position that intersects slit 12a. The length of slit 12a is predetermined so that when tab 10a is folded along score-line 13a, the folded tab is positioned to engage the framing side 16a of the doorjamb 4a (Figure 2).

The jamb/trim portion 11a of skid plate 1 is positioned forward and inward with respect to tab 10a, adjacent slit 12a and score-line 13a respectively, and the jamb/trim portion is shaped to substantially correspond with the crosscut bottom ends of the jamb 4a and exterior trim 5a of the exemplary selected door assembly shown in Figure 2. A first slit 17a extends inward from the exterior threshold edge 18 of the skid plate at a predetermined position that corresponds with the finish side edge 19a of doorjamb 4a in the exemplary door assembly shown in Figure 2, slit 17a providing means for flexing or bending the elongated center portion 9c along its exterior threshold edge 18.

Similarly, the second side portion 9b includes a tab 10b and a jamb/trim portion 11b. Tab 10b is defined by a slit 12b and a score-line 13b. Slit 12b extends in a direction from a second side edge 14b toward the skid plate centerline X-X, and the cooperating score-line 13b extends from the interior threshold edge 15 to a position that intersects slit 12b. The length of slit 12b is predetermined so that when tab 10b is folded along score-line 13b, the folded tab is positioned to engage the framing side 16b of the doorjamb 4b (Figure 2).

The jamb/trim portion 11b is positioned forward and inward with respect to tab 10b, adjacent slit 12b and score-line 13b respectively, and the jamb/trim portion is shaped to substantially correspond with the crosscut bottom ends of the jamb 4b and exterior trim 5b of the exemplary selected door assembly shown in Figure 2. A

second slit 17b extends inward from the exterior threshold edge 18 of the skid plate at a predetermined position that corresponds with the finish side edge 19b of doorjamb 4b in the exemplary door assembly shown in Figure 2, slit 17b providing means for flexing or bending the elongated center portion 9c along its exterior threshold edge 18.

5 It should be understood that although the above detailed skid plate description is directed to a certain door assembly arrangement, the skid plate may be adapted to correspond with any bottom surface arrangement of a door assembly without departing from the scope of this invention.

Referring to Figure 3, during the door assembly process, a skid plate 1 is
10 provided having a length L, between the slits 17a and 17b, that corresponds with a length L', between the finish sides 19a and 19b of the assembled doorjamb 4a and 4b in the selected door assembly 3, so that when the skid plate is installed along the bottom surface 2 of the door assembly 3. This insures that the jamb/trim portions 11a and 11b are properly positioned to correspond with the crosscut bottom ends of their
15 respective jamb and trim members 4a-4b and 5a-5b in the door assembly bottom. As shown in Figure 4, an adhesive 20, suitable for bonding plastic material to a wood substrate, is applied to the crosscut doorjamb and trim bottom ends 4a-4b and 5a-5b respectively as well as along the bottom surface of the interior wood sill plate 8. The adhesive is applied by brushing, rolling, spraying, or dipping; or by any other suitable
20 application means known in the art. The skid plate is placed on the adhesive coated bottom members and position so that the jamb/trim portions 11a and 11b of the skid plate 1 are aligned with the bottom crosscut ends of the jamb and trim members 4a-4b and 5a-5b respectively. It should be understood, however, that the adhesive may be applied to the skid plate 1 instead of to the door assembly bottom surfaces, or

adhesive 20 may be applied to the door assembly bottom surfaces and to the skid plate 1 without departing from the scope of this invention.

As an alternative to the adhesive coating described above, the skid plate may be fastened to the bottom of the door assembly using two strips of double-sided adhesive tape 23a and 23b applied over first side 9a and second side 9b of the door assembly as shown in Figure 8. The tape is preferably coated on both sides with a high performance permanent acrylic adhesive offering high tack and good shear such as FLEXmount laminating adhesive TT 200 L-606 or TT 400 L-606 available from FLEXcon Company, Inc. of Spencer, Massachusetts. The preferred tape also has a 4 mil coat weight and an 84 pound poly-coated differential release liner. Tape 23a is applied over tab 10a and includes an edge aligned with slit 17a, and tape 23b is applied over tab 10b and includes an edge aligned with slit 17b. If the tapes are applied to the skid plate before slits 12a and 12b are formed in the skid plate, slits 12a and 12b will also extend through the tapes. Otherwise, slits aligned with slits 12a and 12b can be formed in the tapes after the tapes are applied. In use, the skid plate is pressed against the underside of the door assembly such that tape strips 23a and 23b adhere to a portion of the bottom of door sill 8, finish side edges 19a and 19b, and the bottoms of the finish/trim portions of the door assembly. Tab 19a and 19b are then folded over framing side 16a and 16b and adhered thereto to hold the skid plate securely in place.

As shown in Figure 5, the positioned skid plate is fixed to the door assembly bottom surface 2 by driving fasteners 21 through the skid plate and into the long grain of the interior wooden sill plate 8. The drawing shows staples being used to attach the "glued" skid plate to the bottom surface 2. However, it should be understood that any suitable fastener such as nails, tacks, screws, etc. may be used.

Referring to Figure 6, after the skid plate is glued and mechanically fastened to the door assembly bottom surface 2, tabs 10a and 10b are folded along their respective score-lines 13a and 13b so that the tabs 10a and 10b contact the framing side surfaces 16a and 16b of the doorjamb. Adhesive may be applied to the
5 respective doorjamb surfaces to bond the tabs 10a and 10b to the doorjamb, and tabs 10a and 10b are attached to the doorjamb by driving fasteners 21 through the tabs and into the long grain along the framing side of the jamb. The flexible center portion 9c extending between the slits 17a and 17b is tucked upward and into the aluminum sill plate 7 along the exterior side of the door, and the door assembly 3 is
10 ready for shipping to a construction site after the adhesive cures and bonds the skid plate 1 to the door assembly bottom surface 2. The tab score-lines 13a and 13b facilitate folding the tabs 10a and 10b into engaging contact with the doorjamb. However, such scoring or notching along the tabs may be eliminated with the understanding that the tab folding operation may be considerably more difficult
15 without score-lines.

In an alternate embodiment shown in Figures 7, tabs 10a and 10b are folded to their upright engaged positions before skid plate 1 is placed on the adhesive coated bottom members along the bottom surface 2. Such pre-folding of the tabs 10a and 10b simplifies positioning the jamb/trim portions 11a and 11b of the skid plate into
20 alignment with the crosscut bottom ends of the jamb and trim members 4a-4b and 5a-5b of the exemplary selected door assembly 3.

It should also be understood that while this invention has been described according to the above various embodiments, it is capable of further modifications, uses, and/or adaptations of the invention, following the general principle of the
25 invention and including such departures from the present disclosure that fall within

known or customary practice in the art to which the invention pertains, and as may be applied to the central features hereinbefore set forth, and fall within the scope of the invention of the limits of the appended claims.